

STATINTL

Stellar Comparator

STATINTL

STATINTL

STATINTL

STATINTL

STATINTL

STATINTL

STATINTL

STATINTL

STATINTL

[redacted] and I visited [redacted] Lab in [redacted] to get some background information on the use of a laser as the measuring device in the [redacted] stellar comparator. We talked to [redacted] Senior Staff Scientist; [redacted] Assistant to the Director; and [redacted] customer relations.

[redacted] reviewed some of the fundamentals of the Spectra Physics lasers with particular reference to the resonance features important to the interferometry techniques used in the measuring devices. Interferometry is sensitive business and needs precise adjustment to work.

[redacted] pointed out that a laser will not only resonate at its principal mode at a precise wavelength, but will also resonate at sidebands which have a very slightly different wavelength. The sidebands in effect produce noise on the interference bands and should be suppressed if possible. This can often be accomplished by reducing the intensity of the laser beam. This produces insufficient stimulation to excite the sidebands. The use of the short 13 inch laser was proper since it had fewer sidebands.

[redacted] suggested four things which could be done as practical improvements in the use of the laser:

1. Carefully adjust the hemispherical resonator on the laser to obtain full spatial coherence across the laser beam.
2. Reduce the intensity of the beam to the minimum usable value in an attempt to suppress the side bands.
3. Use a high pass filter in the detecting circuit to eliminate the low frequency fluctuations introduced by the power supply.
4. Move the laser back and forth along the light path to insure that 10 inch measuring travel was centered in the most sensitive portion of the beam.

The people at [redacted] were reassuring in that they considered the concepts in the use of the laser as a measuring tool to be sound. Of course they could give no opinion on the detail execution.

Declass Review by NIMA / DoD

STATINTL

STATINTL

STATINTL

STATINTL

## Stellar Comparator

STATINTL

Subcontract of [ ]

STATINTL

Originally, this machine was to have a Ferranti fringe measuring grating for measuring in each of the two axes. A Laser measuring technique was proposed by [ ] which appears to be a more accurate device and it is being incorporated into the machine. Also, almost immediate delivery was one of its attractions.

STATINTL

STATINTL

The Laser measuring principle is straightforward and simple. Its simplicity should make it an inexpensive device once it is perfected. Its accuracy depends on the wavelength of the light and not on the accuracy with which a pattern is made. Its dependability however depends upon counting fringes as the measuring stage moves and is therefore subject to all the ills in the electronics that other such devices suffer from, particularly Ferranti. Anything that throws static or a transient into the counting circuit goofs up the count and produces errors.

STATINTL

[ ] were having difficulty with the device. They were trying to install it on the comparator. It was not very clear what the problem was. I think part of it was optical alignment. Apparently there were also problems with the electronics and they were redoing some of the circuitry.

STATINTL

[ ] had hoped to be able to make a decision on Tues., April 24 as to whether to proceed with the Laser measuring device or go back to the Ferranti. It was evident though that they would not have it operating on Tues. Ed decided to go on for the rest of the week for the balance of his activities and return on Saturday to make the decision. That should be enough time for

STATINTL

[ ] to demonstrate whether or not they had a good measuring device.

STATINTL

I suggested that Ed talk to [ ] while he was in Los Angeles. [ ] has a year and a half or more experience with Lasers and has done some measuring work with them. He can provide some background information on their life, stability and general problems in using them. Ed and I plan to see [ ] on Friday afternoon.

STATINTL  
STATINTL

STATINTL

STATINTL

I was not impressed with [ ] structural design. They seemed to put the mass where it would do the least good. They also are using Magnesium for the moving stages, and it is not an especially stable material.

STATINTL

①  
②  
③

(Separate Copy)  
⑤ file.

April 24, 1964

Electroluminescence

STATINTL

STATINTL

[redacted] manufactures plastic panels, laminates and coatings for the Aerospace industry. Their home office

STATINTL

Their panels are made by depositing a green phosphor on an opaque plastic base and then covering that with a transparent plastic material. Different colors are obtained by coloring the transparent plastic overlay. Electrodes are attached to apply a voltage across the phosphor. This must be an AC voltage as the phosphor is not excited by a DC field. They use 115 volts, 400 cycles AC as their standard. Their panels are all special design, design, made to order shapes. Cost varies but is in the range of \$50 per square foot. The principal application is for instrument panels and other displays.

At present their largest panel is 3 ft. by 2 ft, limited by manufacturing equipment. The minimum wall thickness is 3/16 inch. They make only flat panels. They can make contoured panels but such panels are expensive, difficult to manufacture and the rejection rate is high.

Brightness under normal conditions starts out at 7 ft. Lamberts and decays as some function of  $e^{-t}$  to 2 ft. Lamberts in 1000 hrs. In 2000 hours it reaches  $1\frac{1}{2}$  ft. Lamberts and continues to approach some minimum value asymptotically. Brightness can be increased by increasing frequency and voltage. At 208 volts and 800 cps, the brightness will increase to approximately 20 ft. Lamberts, however life is considerably reduced under these conditions.

STATINTL

[redacted] said that [redacted] had made an experimental panel which achieved a brightness of 200 ft. L. It was however a complicated set up and the panel had to be water cooled. Panel life was probably very short.

STATINTL

STATINTL

I told [redacted] that my interest was the possible application of E.L. panels as a light source for photo viewing and I wanted about 1000 ft. L. He said their panels were not bright enough. They had looked at medical X-ray negatives laid on the panels and it was a little difficult to observe details readily.

STATINTL

March 10, 1964

Develop Processing Techniques (Proposal)

STATINTL

STATINTL  
STATINTL

[redacted] had a number of topics to review with [redacted] such as the Chip Processor proposal, the Enhancer, the ABD-4 Dryer, the HTA/5 investigative program, and the HTA/6. This is a full weeks agenda. I attended the discussions on Tues Mar. 10 on the HTA/5 Investigative Program and the discussions with [redacted] on the Chip Film Processor.

STATINTL

STATINTL

STATINTL

Extensive discussion of the proposed investigative program covered a wide range of aspects of the work. [redacted] proposes to set up a separate group reporting to a Research Coordinator who reports directly to the Director of Engineering. They will put a portable clean room in an enclosed area at the North end of their plant. [redacted] agreed with the need for strict security of the area and the control of visitors.

Some examples of the program tasks were discussed such as the need for some basic facts bearing on the requirement for solution filtering and the need for maintaining a clean room condition. This is amenable to investigation and will be part of the program.

STATINTL

[redacted] described his proposed chip film processor. He is also full of ideas for the application of his air and liquid bearings: He mentioned a straight through processor in which the film enters horizontally at the middle of the developer tank, passes through fix and wash and exits from the middle of the wash tank with no mechanical barriers. He also mentioned applying his air bearings to reductions in size of coating alleys. They can't touch the coated emulsion until it dries, so his air bearing permits them to loop the film around without touching it. He is also investigating a new pressure boost processing technique.

STATINTL

[redacted] has done considerable development of his a concept of a chip film system. He is aiming at the commercial amateur market, but much of it is directly applicable the chip film requirements in your shop.

STATINTL

April 1, 1964

STATINTL

Digital Readout Compar\_tor

STATINTL

STATINTL

The first system was shipped to [ ] on Jan. 17, 64.  
According to their shipper, they shipped:

STATINTL

1 ea. Control Panel	Model 2825 A	Serial #1
2 ea. Counters	Model 2826 A	Serial #1 and 2
1 ea. Synchronizer	Model 2827 A	Serial #1
22 Cables		
3 Manuals		

STATINTL

[ ] stressed that the Model A counter is for the  
Optosyn reading head which is what [ ] is using. He  
had had no word from [ ] regarding any  
differences in wiring or other problems with the counters.  
Storie will call [ ] to see if there is any-  
thing he should know about.

STATINTL

STATINTL

STATINTL

STATINTL

The second system was shipped to Franconia on Feb. 25  
and according to the [ ] shipper it contained:

1 ea. Control Panel	Model 2825 A	Ser. #2
2 ea. Counters	Model 2826 B	Ser. #1 and 2
1 ea. Synchronizer	Model 2827 A	Ser. #2
22 Cables		
3 Manuals		

STATINTL

[ ] checked with [ ] the engineer on the  
job. He was fully aware that two model A counters  
went with the first system and two model B counters  
went with the second system. It was inconceivable  
that they could have been mixed up.

STATINTL

STATINTL  
STATINTL

[ ] has your correct mailing address. He will send  
[ ] data regarding their cost overrun on this job.  
They haven't been paid yet and their first invoice  
is over 60 days old and is in their overdue accounts.  
[ ] has no telephone contact for their contracting  
officer. He will resubmit the invoice and hope for  
some action.

STATINTL

STATINTL

[ ] still expects to get the proposal for the  
4-axis counter mailed to [ ] by Friday April 10.  
He was happy to hear that it would be acceptable to  
package the counters as complete units. This is a  
more standard design for them. It cuts down inter-  
connecting cabling and speeds up assemble and check  
out. The enclosed Xerox copy of the present control  
panel is marked to show what will be on the control  
panel and what will be on the counter. All four  
counters will be identical.

STATINTL

STATINTL

STATINTL